EXHIBIT 1

GMA,Inc. *Greg Manning Associates*

A Professional Corporation

.Accident Reconstruction
.Engineering Services

Gregory Manning President

BIOGRAPHICAL OUTLINE
OF
GREGORY MANNING
ACCIDENT RECONSTRUCTIONIST

EXPERIENCE
(25 years)

- Greg Manning Associates, Inc. 1997 - Present
  President, Reconstructionist

- Atlantic Investigations, Inc. 1988 - 1997
  President, Reconstructionist

- Manning & Rothfuss Investigations, Inc. 1987 - 1988
  President, Reconstructionist

- Greg Manning Associates, Inc. 1985 - 1987
  President, Reconstructionist

- Forensic Technologies Corporation 1984 - 1987
  Full-time employee, Accident Reconstruction Coordinator. Charged with the reconstruction of cases, overseeing of reconstruction case work, marketing, presentation of seminars and the conducting of controlled studies.

- Forensic Technologies International Corporation (Formally CADCOM) 1982 - 1984
  Part-time employee. Charged with the training of engineering personnel, travel and data collection, reconstruction analysis of case work.

- Maryland State Police 1974 - 1984
  Road Patrol Trooper (marked patrol vehicle), instructor in safe and fuel efficient vehicle patrol operations, instructor of patrol techniques and pursuit, firearm proficiency instructor, instructor of mandated in-service school, instructor of accident reconstruction, coordinator of accident reconstruction. Baltimore/Metropolitan Troop (includes Baltimore & Anne Arundel Counties); Four (4) State Police Installations.

- United States Marines 1970 - 1974
  Sergeant
  Combat duties in The Republic of South Vietnam
  Other duty stations: Parris Island, SC, Camp Lejuene, NC, Jacksonville, FL, El Toro, CA, Hawthorne, NV, Yuma, AZ, Cherry Point, NC, Philippines, Okinawa, Japan.

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EDUCATION

• Southern High School	Baltimore, Maryland
• Northeast High School	Pasadena, Maryland
• University of Maryland	English Course, Dr. Mayo Wells
• Loyola College	Criminal Justice Courses
• Catonsville CC	Criminal Justice Courses
• Anne Arundel CC	Criminal Justice & Psychology Courses
• Maryland State Police	Motor Vehicle, Criminal Laws, Emergency Medical Applications, Traffic Accident Investigations, Report Preparations, Constitutional Law, State History & Geography, Patrol & Arrest Techniques, Other
• Dynamic Science, Inc.	Engineering Studies dealing with Accident Reconstruction. Physical Laws, Physics Equations and Application, Vehicle Dynamics dealing with Passenger Cars, Tractor-Trailers, Motorcycles, Pedestrians. Data Collection: Vehicle Impact Profiling, Collision Scene Evidence, Roadway Geometry Measurements, Environmental Factors, Demonstrative Studies and General Application of Reconstruction Principles. 1980
• Management Engineers, Inc.	Computer Applications in Accident Reconstruction, Mathematical Reconstruction Applications, Participation in National Highway Traffic Safety Administration & Washington Hospital Trauma Center Study: Explored Human Tolerances on Impact. Criteria for the study was that occupants were belted and harnessed, received life threatening injuries and were transported to the Trauma Center. Angles of impact, injury mechanisms and occupant velocity changes were the key factors examined. 1981
• Maryland State Police Accident Reconstruction School	Mathematical analysis of collision data, basic application of Physical Laws, Demonstrative Studies, Tire and Dynamic Production of Tire Marks, Pedestrian/Motorcycle/Tractor-Trailer Dynamics. Outside professors from various universities and colleges.
• NASS (National Accident Sampling System)	Courses involved seven topics that are presented through slide presentations and study manual. The courses represent the primary training program for NHTSA personnel in the early 1980's. Courses included: Vehicle Inspection, Collision Scene Data, Vehicle Dynamics, Occupant Dynamics, Occupant Injury Classifications, Physics, Mathematics. 1982-1984
• International Association of Accident Reconstruction Specialists	Classroom presentations dealing primarily with the mathematical application to accident reconstruction. Controlled studies dealing with skid dynamics, vaulting, lateral acceleration, commercial and school bus skid dynamics, crash studies, Portland, Maine, 1983

• L & J Accident Reconstruction and Litigation Seminar	Topics: Roadway Through the New MUTCD, Methods of Measurement and Evaluation of Traffic Control Devices, Low-Speed Automobile Accidents: Occupant Kinematics, Dynamics & Biomechanics, Legal & Evidentiary Considerations at Trial, Forensic Aspects of Vision & Highway Safety, Advanced Technology of Accident Reconstruction from Scene to Trial, Roadway Defects and Tort Liability, Memory and Eyewitness Reliability, Bus and Recreational Vehicle Accident Reconstruction and Litigation. August 2000

CONTROLLED STUDIES

- Maryland State Police — Glen L, Martin Airport, Baltimore, Maryland. Skid dynamics of school buses, fire (pumper) trucks & lateral acceleration.
  Hypothesis: Determine the braking performance of school buses when loaded and empty; determine the braking performance of fire trucks (pumper) when loaded and empty; determine the lateral performance (instability) of pumpers when fully loaded with water and ½ filled to capacity; determine the lateral force threshold of a police cruiser. Conducted in conjunction with the University of Maryland Engineering Department and management engineers produced video training tape. Program was organized and funds appropriated by Gregory Manning, 1983

- Maryland State Police

  Perception & Reaction Testing. Human perception and response to a real hazard.
  Hypothesis: Determine human perception and response time.
  Methodology: Utilization of a pressure sensitive switch attached to the brake pedal. Instructor utilized a plunger type switch to detonate an explosive charge at the front bumper of the vehicle. Hearing this, the test subject would apply the brake pedal, causing a second charge. Each charge propelled a yellow chalk mark onto the pavement. The distance between the paint marks was then recorded as the perception/reaction distance. This was conducted in conjunction with the Maryland Safety Council. 1982

- NAPARS — Passenger vehicle skid testing on wet v. dry pavement.

  Hypothesis: Evaluate the degradation of braking performance (if any) of a passenger vehicle during skidding on both wet & dry pavement. *Methodology:* Test vehicle was skid over a dry asphalt pavement. The pavement was then saturated with water and the skid tests duplicated. 1985

- NAPARS — Static v. Dynamic Skid Coefficients.
  Hypothesis: Quantify the different force levels between static and dynamic numbers. *Methodology:* The target vehicle was retrofitted with a tow harness. A 5,000 lb./cap. load-cell was placed within the stranded steel cable. The test vehicle was wenched forward. The load-cell force measurement was recorded. The same vehicle was then put through a series of dynamic skid tests. The results were recorded. 1986

- Independent — Dynamic Skid Testing of Passenger Coaches (buses).
  Hypothesis: Determine the dynamic braking force of a passenger bus.
  Methodology: Utilization of an electronic accelerometer and conventional measurements of braking length of the bus during dynamic skidding at various speeds. 1985

- Independent — Acceleration Testing of 10 ton Truck.
  Hypothesis: Determine the acceleration rate and time of 10 ton truck.
  Methodology: Load truck to maximum capacity and accelerate over a known distance. Repeat testing with empty truck. Utilized an electronic accelerometer and timed video. 1985

- Independent — Acceleration Testing of Loaded and Empty Tractor-Trailers.
  Hypothesis: Measure the rate of acceleration of tractor-trailers both loaded and empty,
  Methodology: Load trailer to maximum load, Conduct acceleration tests, Repeat tests with empty trailer. Utilized electronic accelerometer and video timer. 1986

- NAPARS — Motorcycle Deceleration After Falling to the Ground.
  Hypothesis: Knowing that a motorcycle will sometimes have no contact with the pavement, while experiencing otherwise extreme rates of deceleration, to determine an average braking force.
  Methodology: Accelerate motorcycle via a sled. Using radar speeds, drop the motorcycle from the sled. Measure the distance over which it decelerated. 1987

- Independent — Crash Study of a 62K Dump Truck at Low Speed to Rear of Passenger Car. *Hypothesis:* To profile low impact damage sustained to passenger vehicles involved in an impact with large trucks. Compare the results to impact damage sustained during car to car impacts at the same speed.
  Methodology: Utilizing a graded test site, Determine target speed through gravity acceleration. This removes the human variable. Drift truck to the target speed, striking rear of target vehicle. Laser switch was activated via an interrupter plate mounted at the hood of the dump truck. A photogate timer allowed for the calculation of the dump truck speed over the last 4 inches of travel prior to impact. 1995

- Independent — Propulsion of Inanimate Objects Within Vehicle Interior During Deceleration.
  Hypothesis: Determine trajectory of objects at various elevations at the right front seated position during hard braking conditions.
  Methodology: Construct a three (3) tiered system, placing objects on each of the three levels. Using an accelerometer, decelerate at full braking. Attach a video camera to the right door frame to record the event. Analyze the trajectories through video footage, 1994

- Independent — Motorcycle Helmet Chin Strap Integrity.
  Hypothesis: Conduct acceleration tests to reach maximum force in order to study the integrity of the chin strap.
  Methodology- Using a mannequin head, strap helmet in place. Construct a pendulum acceleration device having a rigid stop block. Using a photogate timer, measure the time over the last 1 inch of travel. Calculate end velocity and acceleration at stop block. 1993

- Independent — Effects of Suspension Modification on Vehicle Cornering Stability.
  Hypothesis: Determine the difference between standard and modified suspension systems during dynamic cornering.
  Methodology: Vehicle was fitted with total calibration capabilities. Pitch and yaw were measured, along with changes in lateral acceleration. All data was recorded electronically. Transportation Research Center, East Liberty, Ohio. 1986

- NAPARS — Passenger Vehicle Crash Studies. Dynamic [Vehicle] Impact Studies.
Hypothesis: To quantify the accuracy of standard equations used in accident reconstruction, including regression and momentum.
Methodology: Collide passenger type vehicles into one another. Speeds of striking vehicles were measured by radar. Measurements were taken post impact. Computations were than performed. 1985

- NAPARS — Conventional v. Anti-Lock Brake Systems Testing.
Hypothesis: Determine variance between braking performance of standard v. anti-lock brake systems. 1988

- Independent — Possibility of Cargo Shift During Tractor-Trailer Transport.
Hypothesis. Determine over-the-road forces experienced by a tractor-trailer and its load.
Methodology: Load and shore tractor-trailer cargo as described in procedural guidelines. Transport cargo from Erie, Pennsylvania to Harrisburg. Utilize video cameras in cargo holding area as well as through tractor windshield. Place accelerometer in the cargo hold area, along with "g" drop analyzers. Record all forces and examine shoring of load. 1992

- Independent — Analysis of Cargo Instability During Cornering.
Hypothesis: Drive loaded tractor-trailer through curved path to determine lateral force and instability, if any.
Methodology: Load tractor-trailer, to test parameters. Travel at uniform velocities through a curved path. Utilize accelerometer. Examine roll dynamics and lateral accelerations. 1994

- Independent — Push-rod Movement as a Function of Brake Force.
Hypothesis: Determine the variance in brake performance based on travel of push-rod.
Methodology: Adjust push-rod travel to minimum federal requirements of two (2) inches. Perform dynamic skid tests at between 25 and 30 miles per hour. Adjust pushrod stroke to one (1) inch, perform dynamic skid tests at 25 to 30 miles per hour. Record data with accelerometer and measurement of overall brake distance. Evaluate variance in brake performance. 1997

- Independent — Vertical Movement of Vehicle Front\Rear Bumper During Dynamic Loading.

Hypothesis: Determine the front end "dipping" and rear end "rise" of a passenger vehicles bumpers during hard braking.
Methodology: Retrofit the front and rear of the test vehicle with a Dynamic Vehicle Pitch Recorder (DVPR). Record braking force with an accelerometer. Record DVPR indicator gauge reading in ¼ inch intervals. 1995

- Independent — Vertical Movement of Dump Truck Front Bumper During Dynamic Loading.

Hypothesis: Evaluate the dynamic movement of a dump truck front bumper (vertically) during hard braking.
Methodology: Retrofit the front of the dump truck with a Dynamic Vehicle Pitch Recorder (DVPR), Record braking force with an accelerometer. Record DVPR indicator gauge reading in ¼ inch intervals. 1995 (Joint with above)

- Independent — Radial Tire Dynamics/Lateral Acceleration Over Gravel Surface.
  Hypothesis: Evaluate the lateral acceleration of the vehicle, deflection of the tire sidewall and the dispersion of gravel.
  Methodology: Equip vehicle with an electronic accelerometer. Fabricate a camera mount outside the vehicle and directed at fire level to record deflection of tire, dispersion of gravel and cornering ability at speed ranges of 35 to 40 mph. Turning circle was predetermined. 1990

- Independent — Visibility of Tractor-Trailer Driver to Front of Special Mobile Equipment.
  Hypothesis: Correlation of two distances. Determine ratio between following distance of tractor-trailer, to Special Mobile Equipment, to that of the SME, to the vehicle that it (SME) is following.
  Methodology: Utilize subject tractor-trailer, special mobile equipment vehicle and passenger vehicle. Conduct visibility study to quantify the ratio between the two distances. 1988

- Independent — Skid Dynamics Testing of Loaded Cement Mixer.
  Hypothesis: Quantify the braking performance of a loaded cement mixer.
  Methodology: Equip cement mixer with an electronic accelerometer. Skid truck on asphalt pad at speeds ranging from 25 to 30 miles per hour. Utilize radar to record braking speed. Wait 30 minutes between test runs to insure brake cooling. Measure braking distance and record accelerometer data. 1990

- Independent — Turning Circle Tests of Commercial Passenger Bus.
  Hypothesis: Quantify the shortest turning circle of the bus and tracking of front to rear axles.
  Methodology: Turn bus in a circle at 100% steering wheel movement. Mark pavement showing front and rear tire paths. Determine lateral tracking performance.

- Independent — Quantify the Visibility of a Tractor-Trailer Resting on its Side.
  Hypothesis: Quantify reflective capabilities of the underside of a trailer.
  Methodology: Construct a box trailer 45 feet in length. Utilizing photographs, produce and paint sample to same color scheme. Transport to a remote location and assemble. Utilize passenger vehicle headlamps at both low and high beam intensity. Determine distance that the unit can be observed.

Numerous other studies have been completed to date, including dynamic skid testing of numerous passenger buses, large trucks, tractor-trailers, day/night visibility, lateral acceleration, skid mark and damage profiling, and others. Conducted over a 15 year period.

TEACHINGILECTURING ACTIVITIES

- Maryland State Police, Accident Reconstruction Schools
- Maryland State Police, Recruit training in Road Patrol and Arrest Procedures
- Maryland State Police, Safe and Fuel Efficient Driving
- Vehicle Control in Adverse Surface Conditions
- Decision Making and Maintenance of Vehicle Control During Pursuit
- High Speed Maneuvers and Understanding Dynamic Vehicle Response
- Vehicle Dynamics and Control Mechanics

TEACHING/LECTURING ACTIVITIES (continued)

- Maryland State Police, Mandated In-Service School
- Maryland State Police, Firearms Proficiency & Marksmanship Instructor
- Maryland State Police, Firearms Safety & Handling Instructor
- State of Maryland, Certified Firearms Instructor, for Private Sector
- Charles County Community College, Accident Reconstruction Segment
- Maryland Bar Association, Ocean City, Maryland
- Maryland Prosecutors Association, Towson, Maryland
- Anne Arundel County Bar Association, William & Mary, Williamsburg, Virginia
- Prince George's County Bar Association, Upper Marlboro, Maryland
- American Bar Association, New Orleans, Louisiana
- Inns of the Court, Baltimore, Maryland
- Atlantic County Office of Law, Atlantic County, New Jersey
- Anne Arundel County Police Department, Davidsonville, Maryland
- Maryland Truckers Association, Bermuda
- Mountain Bell Corporation, Denver, Colorado
- Supreme Court Building, Georgetown University Law Students
- Insurance Claims Groups:

Colorado
Denver
Delaware
Wilmington
Maryland
Annapolis
Baltimore City
College Park
Hagerstown
Ocean City
Rockville

Massachusetts
Boston
New York
Manhattan
Pennsylvania
Exton
Harrisburg
Philadelphia
Pittsburgh
Wilkes-Barre

Virginia
Norfolk Richmond
Roanoke
Williamsburg
Washington, D.C.
West Virginia
Charles Town
Charleston
Morgantown
Princeton

PUBLICATIONS

- Critical Side Scuff & Speed Determination
- Vehicle Placement at Impact
- Vehicle Accident Reconstruction
- Analysis of Headlamp & Taillamp Filaments
- Vehicle Inspection & Data Collection
- Occupant Positioning on Impact
- Pedestrian Impact Dynamics
- Suicide & the Automobile
- Human Perception & Reaction

ASSOCIATIONS & AFFILIATIONS

- National Association of Professional Accident Reconstructionists (NAPARS)
  Co-Founder, 1985
  President, 1985 - 1987
  Vice President, 1989 - 1990
  Current Member
- Society of Automotive Engineers (SAE)
- Maryland Investigative & Security Association (MISA)
- National Sporting Clays Association (NSCA)
- National Rifle Association (NRA)

ADDITIONAL EXPERTISE

- Past Maryland State Police Firearms Instructor
- Certified in Small Arms Handling & Safety
- Certified Firearms Instructor - Seven Years
- Pistol Master Ranking -
- Participated in Pistol Competition
- Instructed all Levels of Police Personnel
- Currently Active in Firearms Sports & Competition

GEOGRAPHICAL AREAS OF RECONSTRUCTION TO DATE

- Twenty-nine (29) States • Five (5) Foreign Countries

CURRENT LOCATION OF EXPERT COURT TESTIMONY

Delaware
New Castle County

Florida
Broward County

Kentucky
Daviess County

Maryland
Allegany County
Anne Arundel County
Baltimore County
Baltimore City
Calvert County
Caroline County
Carroll County
Cecil County
Charles County
Dorchester County
Frederick County
Garrett County

Maryland (continued)
Harford County Howard
County Kent County
Montgomery County
Prince George's County
Queen Anne's County
Somerset County
Talbot County
U.S. District Court, Northern
U.S. District Court, Southern
Washington County
Wicomico County
Worcester County

Massachusetts
Boston
Essex County

New Jersey
Atlantic City
Atlantic County

New Jersey (continued)
Camden County

New York
New York City

North Carolina
U.S. District Court

Pennsylvania
Adams County
Bradford County
Delaware County
Fulton County
Gettysburg County
Lycoming County
Montour County
Philadelphia County
U.S. District County
Eastern York County

Virginia
Accomack County

Virginia (continued)
City of Alexandria
Clarke County
Loudon County
City of Portsmith
City of Richmond
U. S. District Court

Washington, D.C.
Superior Court
U. S. District Court

West Virginia
Berkeley County
Hampshire County
Jackson County
Jefferson County
Mercer County
Monongalia County
Putnam County
Raleigh County
U. S. District Court, Northern
U. S. District Court, Southern